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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/056,271

01/23/2002

Gary R. Janik

KLA-003

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12/28/2004

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EXAMINER

STOCK JR, GORDON J

ART UNIT

PAPER NUMBER

2877

DATE MAILED: 12/28/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/056,271

Applicant(s)

JANIK ET AL.

Examiner

Gordon J Stock

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 8/26/04; 9/20/04; 12/06/04.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 and 29-49 is/are pending in the application.
- 4a) Of the above claim(s) 22, 23, 25, 26, 38-40, 45, 46, 48 and 49 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6, 8-21, 24, 27, 29-31, 33-37, 41-44 and 47 is/are rejected.
- 7) ☒ Claim(s) 7 and 32 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 August 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date: _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date: _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. **Claims 1, 8, 14, 17, 18, 19, 20, 21, 24, 27, 33, 35, 36, 37, 41, 44, and 47** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Elliott et al. (5,669,979)-previously cited**.

As for **claims 1, 27, 33, and 41**, Elliott discloses in a photoreactive surface processing system: an energy beam (pulsed) source for directing an energy beam at a contaminant layer of a test sample on a stage to remove the layer from the test sample; a light scattering monitoring system to measure the cleaning of the surface (Fig. 15: 422, 518, 520, 436, 476, 414; col. 21, lines 25-40). The test sample may comprise a thin film (Fig. 13: substrate with implanted photoresist layer; col. 25, lines 25-30; col. 26, lines 1-10). He does not explicitly state that the monitor being a thin film analysis module for measuring a thin film. However, again, he teaches that thin film's may be laser cleaned (col. 25, lines 25-67; col. 26, lines 1-25) and that the monitor measures cleanliness (col. 21, lines 25-40). Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made that the monitor was a thin film analysis module for measuring thin films, for the monitor measures the cleanliness of laser cleaned thin film samples.

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As for **claims 8 and 14**, Elliott discloses everything as above (see **claim 1**). And discloses the light source may be a pulsed laser source such as an alexandrite source (col. 21, lines 13-15).

As for **claim 17**, Elliott discloses everything as above (see **claim 1**). And discloses a fiber may be used to transmit the laser light to the test region (col. 26, lines 20-30).

As for **claim 18**, Elliott discloses everything as above (see **claim 1**). And the system may comprise a flashlamp (col. 11, lines 60-67).

As for **claims 19 and 35**, Elliott discloses everything as above (see **claims 1 and 27** above). As for a non-functional region, Elliott does not explicitly state that the analysis area comprises a non-functional area. However, ion implantation is used to fabricate semiconductor devices; whereby, there would be areas of ion doping and area of no ion doping (col. 23, lines 5-55). Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made that the test sample would comprise areas of non-functionality and functionality for a test sample such as a wafer has areas that are ion doped and not ion doped.

As for **claims 20 and 36**, Elliott discloses everything as above (see **claims 1 and 27**). And the beam spot is 20 microns by 20 microns or larger in area (col. 10, lines 64-67).

As for **claims 21, 24, 37, 44, and 47**, Elliott discloses everything as above (see **claims 1, 27 and 41**). In addition, the probe beam of the monitoring laser is approximately at the same position as the cleaning laser (Fig. 15: 518, 420, 428, 416). As for a second location of cleaning and monitoring, the wafer is scanned; thereby, multiple areas of exposure and measurement may be accomplished (Figs. 10a and 10b).

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3. **Claims 2-5, 29, 30, 42** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Elliott et al. (5,669,979)**—previously cited in view of **Rangarajan et al. (6,771,374)**.

As for **claims 2-5, 29-30, and 42**, Elliott discloses everything as above (see **claims 1, 30, and 41**). He discloses that the monitoring system comprising a light scattering system (col. 21, lines 30-35). He is silent concerning reflectometry, ellipsometry, SE, or SWE. However, Rangarajan in a scatterometry based measurement system teaches measuring a sample while being processed such as during cleaning (col. 1, lines 25-30; Fig. 2) that may comprise single wavelength ellipsometry, reflectometry, spectroscopic ellipsometry (col. 6, lines 1-10; col. 6, lines 65-67; col. 7, lines 1-5). Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to have the monitoring system comprise an ellipsometric, single wavelength ellipsometric, spectroscopic ellipsometric, or a reflectometric system, all scattered light monitoring systems in order to monitor the cleaning performance during laser ablation.

4. **Claims 9-13, 15, 34, and 43** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Elliott et al. (5,669,979)**—previously cited in view of **Morris et al. (6,472,295)**—previously cited.

As for **claims 9-13, 15, 34, and 43**, Elliot discloses everything as above (see **claims 8, 33, and 41 above**). In addition, Elliott discloses the use of a Nd:YAG pulsed laser operating at 532 nm, 355nm, 266nm, and 1064nm (col. 12, lines 13-20). As for the laser being a modulated continuous laser with a laser diode and being q-switched, Elliott is silent. However, Morris teaches in an apparatus for laser ablation teaches that a pulsed Nd:YAG laser comprises a diode and suggests that it is continuous made pulsed through modulation and q-switching (col. 2, lines 30-55). Therefore, it would be obvious to one of ordinary skill in the art at the time the invention

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was made that the system comprised a continuous laser made pulsed through modulation that is also q-switched and comprised a laser diode in order to provide lasing, control, and pulse modulation for the pulsed Nd:Yag laser.

5. **Claims 6, 31, and 42** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Elliott et al. (5,669,979)**—previously cited in view of **Fukuda et al. (4,876,983)**—previously cited.

As for **claims 6, 31, and 42**, Elliott discloses everything as above (see **claims 1, 27, and 41**). He discloses that the monitoring system comprising a light scattering system (col. 21, lines 30-35). And that Auger analysis may be used to identify contaminants (col. 55-60). He does not explicitly state that Auger analysis is a non-contact electrical system. Fukuda in a plasma operation apparatus suggests that Auger analysis is a non-contact system that deals with scattering (col. 11, lines 25-55). Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made that the system comprise a non-contact electrically based system such as Auger electronic spectroscopy to determine purity of the test area and therefore possible presence of residual contaminants.

6. **Claim 16** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Elliott et al. (5,669,979)**—previously cited in view of **Haight et al. (6,333,485)**—previously cited.

As for **claim 16**, Elliott discloses everything as above (see **claim 1**). However, he is silent concerning the laser producing energy between 5 and 100 microjoules. Haight in a method for minimizing sample damage during laser ablation teaches of using a pulse energy between 10 nanojoules and 1 millijoule to prevent undesired damage to the material underneath the ablated surface (col. 1, lines 45-50; col. 3, lines 10-15). Therefore, it would be obvious to one of

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ordinary skill in the art at the time the invention was made to have the pulse energy between 5 and 100 microjoules, for an energy between 10 nanojoules and 1 millijoule prevents undesired damage to the material underneath the ablated surface.

Allowable Subject Matter

7. **Claims 7 and 32** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

As to **claim 7**, the prior art of record, taken alone or in combination, fails to disclose or render obvious in a thin film analysis system the thin film analysis module comprises a contact-based electrical analysis system, in combination with the rest of the limitations of **claim 7**.

As to **claim 32**, the prior art of record, taken alone or in combination, fails to disclose or render obvious in a method for analyzing a test sample wherein measuring the thin film comprises performing a contact-based electrical analysis in combination with the rest of the limitations of **claim 32**.

Response to Arguments

8. Applicant's arguments, see Remarks, filed 8/26/04, and Applicant's Interview Summary filed 12/6/04 with respect to the rejection with **Abercrombie et al. (5,666,063)** have been fully considered and are persuasive. The rejection under 35 U.S.C. 102(b) with **Abercrombie et al. (5,666,063)** has been withdrawn.

9. Applicant's arguments, see Remarks filed 8/26/04 filed 8/26/04, and Applicant's Interview Summary filed 12/6/04 with respect to the rejection(s) of **claim(s) 1, 8, 14, 17, 18, 20, 21, 24, 27, 33, 36, 37, 41, 44, and 47** under 35 U.S.C. 102(b) using **Elliott et al. (5,669,979)** and

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the rejections under 35 U.S.C. 103(a) in view of **Haight et al. (6,333,485)**, **Fukuda et al. (4,876,983)**, and **Morris et al. (6,472,295)** have been fully considered and are persuasive.

Therefore, the rejections have been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of **Elliott et al. (5,669,979)** under 35 U.S.C. 103(a). See above. Specifically, Elliott's embodiment of Fig. 15 measures a semiconductor substrate with a monitor that measures cleanliness of the substrate (col. 21, lines 25-35). He does not explicitly state the monitor is a thin film analysis module. However, he teaches that other applications may be used with the cleaning system such as thin film head cleaning, pellicle cleaning, thin film cleaning (col. 25, lines 25-67; col. 26, lines 1-25). Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made that the monitor was a thin film analysis module, for the monitor measures the cleanliness of laser cleaning performed on thin film heads, pellicles, or thin films.

10. As for the arguments concerning the rejection under 35 U.S.C. 103(a) in view of **Elliott et al. (5,669,979)** and **Lensing (6,383,824)**, they have been considered but are moot in view of the new ground(s) of rejection.

Fax/Telephone Numbers

If the applicant wishes to send a fax dealing with either a proposed amendment or a discussion with a phone interview, then the fax should:

- 1) Contain either a statement "DRAFT" or "PROPOSED AMENDMENT" on the fax cover sheet; and
- 2) Should be unsigned by the attorney or agent.

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This will ensure that it will not be entered into the case and will be forwarded to the examiner as quickly as possible.

Papers related to the application may be submitted to Group 2800 by Fax transmission. Papers should be faxed to Group 2800 via the PTO Fax machine located in Crystal Plaza 4. The form of such papers must conform to the notice published in the Official Gazette, 1096 OG 30 (November 15, 1989). The CP4 Fax Machine number is: (703) 872-9306

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gordon J. Stock whose telephone number is (571) 272-2431.

The examiner can normally be reached on Monday-Friday, 10:00 a.m. - 6:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley, Jr., can be reached at 571-272-2800 ext 77.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private Pair system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

gs

December 22, 2004



Layla Lauchman
Patent Examiner
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